

## Space Weather Forecast

Issued on Thursday, 20 April 2023 at 01:11 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

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**Space Weather Forecast Headline:** Minor Geomagnetic Storms likely due to CME (Coronal Mass Ejection) activity, with a lower risk of Moderate or Strong Storms on 20 and 21 April. Chance of Moderate-class X-ray flares (R1-R2 Minor-Moderate radio blackouts) throughout.

### Analysis of Space Weather Activity over past 24 hours

**Solar Activity:** Solar activity has been Low with occasional Common-class flares observed. There are currently six active regions on the visible disc. A region in the northwest is the largest region on the disc. This has shown some minor growth of intermediate spots in recent hours. The remaining groups are small and simple, and appear to be either stable or in slow decay. No Earth-directed Coronal Mass Ejections (CMEs) have been observed in available imagery during the last 24 hours.

**Solar Wind / Geomagnetic Activity:** The solar wind showed ongoing weak CME effects. Wind speed was initially elevated between 520-600 km/s, but eased during the period and is now slightly elevated around 420 km/s. Total magnetic field strength was at weak to moderate levels, with the north-south component varying moderately. Geomagnetic activity was Quiet to Active (Kp 1-4).

**Energetic Particles / Solar Radiation:** No solar radiation storms were observed.

### Four-Day Space Weather Forecast Summary

**Solar Activity:** Solar activity is expected to generally be Low, with a chance of isolated Moderate activity, mainly due to the larger region in the northwest.

**Solar Wind / Geomagnetic Activity:** A CME may arrive at Earth on Days 1 or 2 (20 or 21 Apr), but confidence is low in the timing and impact of this feature. Otherwise, a coronal hole high speed stream may give elevated wind speeds on Days 3 or 4 (22 or 23 Apr). Geomagnetic activity is forecast to be Quiet to Unsettled at first. Activity is likely to reach G1/Minor Storm levels (Kp5) on 20 or 21 Apr due to the anticipated CME arrival, with a lower risk of G2/Moderate (Kp6) or G3/Strong Storm (Kp7) conditions. Effects will slowly decline through the following days. This is likely to give visible aurora over Scotland, with a low chance of aurora further south across Northern Ireland, Wales and northern/central England.

**Energetic Particles / Solar Radiation:** Solar radiation is currently at background levels, with just a slight chance of any increase reaching the S1/Minor Storm level or greater. This is mainly due to the risk of flaring from the larger region in the northwest of the disc.

## Geomagnetic Storms:

| Geo-Magnetic Storm       | Level    | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) | Day 2 (00-24 UTC) | Day 3 (00-24 UTC) | Day 4 (00-24 UTC) |
|--------------------------|----------|------------------------|-------------------|-------------------|-------------------|-------------------|
| Probability (Exceedance) |          |                        | (%)               | (%)               | (%)               | (%)               |
| Minor or Moderate        | G1 to G2 | No                     | 60                | 60                | 30                | 10                |
| Strong                   | G3       | No                     | 20                | 20                | 5                 | 1                 |
| Severe                   | G4       | No                     | 1                 | 1                 | 1                 | 1                 |
| Extreme                  | G5       | No                     | 1                 | 1                 | 1                 | 1                 |

## Radio Blackouts - X Ray Flares:

| X Ray Flares | Level         | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) | Day 2 (00-24 UTC) | Day 3 (00-24 UTC) | Day 4 (00-24 UTC) |
|--------------|---------------|------------------------|-------------------|-------------------|-------------------|-------------------|
| Probability  |               |                        | (%)               | (%)               | (%)               | (%)               |
| Active       | R1-R2 M Class | No                     | 30                | 30                | 30                | 30                |
| Very Active  | R3 to R5 X    | No                     | 1                 | 1                 | 1                 | 1                 |

## Solar Radiation Storms - (High Energy Protons):

| Radiation Storms         | Level (cm <sup>-2</sup> sr <sup>-1</sup> s <sup>-1</sup> ) | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) | Day 2 (00-24 UTC) | Day 3 (00-24 UTC) | Day 4 (00-24 UTC) |
|--------------------------|------------------------------------------------------------|------------------------|-------------------|-------------------|-------------------|-------------------|
| Probability (Exceedance) |                                                            |                        | (%)               | (%)               | (%)               | (%)               |
| Active                   | ≥ S1                                                       | No                     | 5                 | 10                | 10                | 10                |
| Very Active              | ≥ S3 *                                                     | No                     | 1                 | 1                 | 1                 | 1                 |

\* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm<sup>-2</sup>sr<sup>-1</sup>s<sup>-1</sup>)